

The SIRTf Science Center Enters the Home Stretch

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The Space Infrared Telescope Facility (SIRTf) will be launched in July 2002, and will perform an extended series of science observations at wavelengths ranging from 20 to 160 microns for five years or more. The California Institute of Technology has been selected as the home for the SIRTf Science Center (SSC). The SSC is responsible for evaluating and selecting observation proposals, providing technical support to the science community, performing mission planning and science observation scheduling activities, instrument calibration during operations and instrument health monitoring, production of archival quality data products, and management of science research grants.. The science payload consists of three instruments delivered by instrument Principal Investigators located at University of Arizona, Cornell, and Harvard Smithsonian Astrophysical Observatory. The SSC is responsible for design, development, and operation of the Science Operations System (SOS) which will support the functions assigned to the SSC by NASA..

In the past year, six Legacy Science Teams have been selected to conduct extensive observation programs with the Observatory and to release the data from those programs rapidly to the science community during flight operations. Electronic mission planning and proposal submission tools were provided by the SSC to support proposal submission and selection of the six teams in the fall of 2000. These six teams are providing their detailed individual observations to the SSC during the month in which ADASS XI will be held. These observations will be added to over 6000 observation requests previously submitted by the Guaranteed Time Observers in the Science Operations Database resident at the SSC. The GTO and Legacy observations will comprise the majority of science observations during the first year of SIRTf operations. The SOS is now in the final stages of development, with over 1.2 million lines of code and data systems now in place supporting proposal submission; observation planning by the Guaranteed Time Observers, Legacy Teams and the general science community; mission planning and scheduling of the science observations and instrument engineering activities; and pipeline design and processing of instrument data. Innovative web-based tools for planning observations with SIRTf have been successfully downloaded to hundreds of user sites. Extensive final work on the instrument data processing pipelines

is now underway using the latest pre-flight instrument test data obtained under operating temperature conditions.

The SIRTf spacecraft, mission profile, and science instrument design have undergone almost ten years of refinement. SIRTf development and operations activities are highly cost constrained. The cost constraints have impacted the design of the SOS in several ways. The Science Operations System has been designed to incorporate a set of highly efficient, easy to use tools which will make it possible for scientists to propose observation sequences in a rapid and automated manner. The use of highly automated tools for requesting observations will simplify the long range observatory scheduling process, and the short term scheduling of science observations. Pipeline data processing will be highly automated and data-driven, utilizing a variety of tools developed at JPL, the instrument development teams, and Space Telescope Science Institute to automate processing. An incremental ground data system development approach has been adopted, featuring periodic deliveries that are validated with the flight hardware throughout the various phases of system level development and testing. This approach minimizes development time and decreases operations risk.

This paper will describe the top level architecture of the SOS, the current status of the evolution of the SSC systems and capabilities, and an overview of plans for remaining development and testing prior to launch. This work was performed at the California Institute of Technology under contract to the National Aeronautics and Space Administration.